Appendix C

Essential Fish Habitat Assessment

Regulatory Background

The 1996 Sustainable Fisheries Act enacted additional management measures to protect commercially harvested fish species from overfishing. Along with reauthorizing the Magnuson-Stevens Fishery Conservation and Management Act Reauthorization (16 U.S.C. 1801-1882), one of those added measures is to describe, identify, and minimize adverse effects to Essential Fish Habitat (EFH). The regulations defining EFH are in 50 CFR Part 600. EFH is defined as habitat necessary to the species for spawning, breeding, feeding, or growth to maturity (i.e. all life stages). Those habitats include: aquatic areas and their associated physical, chemical, and biological properties that are used by fish; sediment, hard bottom, and structures underlying the waters; and associated biological communities. Potentially impacting activities may have effects on essential fish habitats that are direct (e.g. physical disruption) or indirect (e.g. loss of prey species). Those effects can be site-specific, habitat-wide, cumulative, and/or synergistic.

In 2005, a Final Environmental Impact Statement (EIS) for EFH in Alaska was issued by the National Marine Fisheries Service and the North Pacific Fishery Management Council (NMFS and NPFMC 2005). This included a decision on how EFH should be identified and a current description of these habitats by species based on the preferred alternative. The only EFH designated in the Northeast NPR-A Planning area is for salmon. This includes all five species of Pacific salmon: chinook (*Oncorhynchus tshawytscha*), coho (*O. kisutch*), pink (*O. gorbuscha*), sockeye (*O. nerka*), and chum (*O. keta*).

Federal agencies are required to consult with the NOAA Fisheries Service (National Marine Fisheries Service) on activities, including non-oil and gas activities and oil and gas leasing and development that may adversely affect the essential fish habitat. This consultation should be consolidated with environmental review required by other statutes, such as the National Environmental Policy Act (50 CFR 600.920(e)).

Salmon EFH

Generally, there is little evidence of viable, self-sustaining salmon populations in the Beaufort and the northern (north of 70° N. latitude) Chukchi Sea. Present salmon "populations" have a very difficult time establishing and persisting in the Arctic, most likely because of the marginal habitats (Craig 1989a; Fechhelm and Griffiths 2001). Conclusions based on a survey of available information describing salmon stocks in the Beaufort Sea (Fechhelm and Griffiths 2001) indicate only a few isolated spawning stocks of chum and pink salmon that might occur in the region, primarily the Sagavanirktok and Colville rivers. Small runs of pink and chum salmon have been noted in the Colville River (Bendock 1979b, McElderry and Craig 1981) and in recent years these species have been taken in the Colville and Itkillik rivers as part of the fall subsistence fishery (George 2004). However, catches in scientific sampling and in the subsistence fishery are extremely low (Pedersen and Shishido 1988 *in* Craig 1989b; Moulton 1994, 1995, 1996b, 1997) and no known spawning sites have been identified for these species. Chinook, coho, and sockeye

salmon are even rarer than pink and chum salmon in the region. The salmon populations in and adjacent to the Planning Area can be considered marginal.

The preferred alternative selected in the NMFS and NPFMC EIS (2005) determines that:

> "For salmon FMP (Fishery Management Plan) species, the analysis is broken into three parts: marine, nearshore, and freshwater. Marine and nearshore salmon EFH is generally described to include all marine waters from the mean higher tide line to the limits of the EEZ (Exclusive Economic Zone) since science recognizes that salmon are 1) distributed throughout all marine waters during late juvenile and adult life stages and 2) found nearshore and along coastal migration corridors as early juvenile life stages out-migrate and adult life stages return to and from freshwater areas, respectively. Freshwater areas used by egg, larvae, and returning adult salmon will be analyzed as those areas indexed in ADF&G's *Catalogue of Waters Important for the Spawning,* Appendix D Final EFH EIS – April 2005 D-48 *Rearing, or Migration of Anadromous Fishes* (ADF&G 1998a), specifically Pacific salmon species. Freshwater salmon systems are generally defined as those areas above mean higher tide to the upper limits of those freshwater systems supporting salmon and may include contiguous wetland areas, such as those areas hydrologically connected to the main water source via access channels to an adjacent river, stream, lake, pond, etc." (page D-47).

Although the EIS identifies the 1998 version of ADF&G's *Catalogue of Waters Important for the Spawning*, there is more current information regarding the distribution of anadromous fish in Alaska, available on the worldwide web (ADFG 2005; Johnson et al. 2004). This updated version is utilized for the purpose of this analysis (April 10, 2007).

In the planning area, the Colville River (330-00-10700), Ublutuoch River (330-00-10840-2017), Fish Creek (330-00-10840), Judy Creek (330-00-10840-2043), and Ikpikpuk River (330-00-10900) meet this criterion. A brief description of habitats utilized by salmon at various life stages follows. More details on habitat in the planning area is discussed in section 3.3.5 Fish.

Freshwater overwintering habitat, including spawning gravel that does not freeze and kill spawned fish eggs, is extremely limited in the northeast Chukchi Sea coast area and probably is the largest controlling factor limiting the viability of northern Chukchi Sea salmon stocks at present (Craig 1989a; Fechhelm and Griffiths 2001). Most benthic invertebrates, such as insects living on streambeds and insects and zooplankton living in the water column, are freshwater prey for one or another salmon species.

For salmon, freshwater spawning areas are also the egg and larvae habitat for up to 11 months after spawning. Juveniles of pink and chum salmon, the most common and most adapted salmon to the northeastern Chukchi Sea environment, do not require juvenile freshwater rearing habitat because the young hatch in early spring and migrate soon after to saltwater. Coho, sockeye, and king salmon require year-round juvenile rearing habitat for 1 to 3 years. Sockeye typically require freshwater lake rearing habitat for up to 2 years.

The nearshore (estuarine) zone is used primarily by juvenile salmon smolt during physiological adaptation from the freshwater to the saltwater environment. This outmigration takes place from the time the ice moves out through August. Feeding during this time, especially in the first few days, is thought to be especially critical to survival. Thus, prey and prey habitat are an important

part of this particular habitat. Additionally, adults returning to spawn will transit the estuarine zone and may wait there while their osmoregulatory system adapts from saltwater to freshwater. Individual fish probably take only a few days to a week to transit this estuarine area.

The marine juvenile and adult stages are the principal growth periods of salmon and can last from 1 to 6 years. During this period, prey and prey habitat are the most critical components of the marine essential fish habitat. Prey commonly consists of animals near the water surface (epipelagic zooplankton), particularly copepods. Chinook salmon and larger sockeye, coho, and chum salmon also consume fish. There appears to be very limited use of the northern Chukchi Sea or Beaufort Sea for these stages.

Besides redefining the way that EFH is identified in Alaska, the NMFS and NPFMC EIS (2005) also established an approach to identify Habitat Areas of Particular Concern (HPACs) within EFH. This designation for particularly critical habitats already existed, but the EIS officially adopted a new approach for HPACs. The preferred alternative stated:

> "…the existing HAPC identifications would be rescinded, and the Council would adopt an approach that would allow specific sites within EFH, selected to address a particular problem, to be identified as HAPCs in the future." (ROD page 2).

In general, this was a shift from viewing HPACs as broad habitat types to a site-based approach in order to better accomplish management objectives.

Ecologically, the Beaufort Sea and northern Chukchi Sea can be considered a population sink for salmon rather than a source, drawing excess salmon from other areas rather than producing a surplus that colonizes new areas. The scarcity of salmon documented in the Beaufort Sea and the fact that it is close to the northern boundary of the geographic distribution support the population sink theory.

Recent occurrences raise the question of whether significant temperature increases in the Arctic caused by climate change could lead to a significant change in salmon distribution in the future. Higher salmon catches off of Point Barrow in recent years (personal communication with Craig George, 2006) indicates an increase in the number of salmon moving through the northern Chukchi Sea. Additionally, local residents living near the Beaufort Sea have noticed increases in salmon occurrences over the past 10 to 20 years (Pedersen 1995; Napageak 1996). Several published journal notes of first records of salmon in the Canadian Beaufort Sea that occurred in the past decade (Babaluk et al. 2000) also indicate the increasing, but still rare, incidence of salmon in the Beaufort Sea.

Action, Potential Effects on EFH, and Mitigation

The actions covered by this EFH analysis are thoroughly described within chapter 2 of this IAP/EIS. In general, the focus is on oil and gas exploration and development activities, including associated infrastructure, various scenarios of development, and oil spills. However, non-oil and gas activities are also considered.

Potential effects on salmon EFH from oil and gas activities (and non oil and gas activities) in the NE NPR-A Planning Area are the same as those described for other fish habitat in chapter 4, environmental consequences. Most alternatives provide similar guidelines for protection, whether in the form of Lease Stipulations or ROPs. The primary difference among alternatives is the level

of anticipated oil and gas development. Therefore, the potential for impacts to EFH is relative for each Alternative. The greatest potential for impacts exists under Alternative C, with increasingly less risk under Alternatives D, B, and A, respectively.

Through numerous Lease Stipulations and ROPs the various alternatives attempt to mitigate potential impacts to fish and their habitat. These are summarized in Table 2-2. Specific application of these stipulations and ROPs to protecting fish habitat is described in sections 4.3.7 (Alternative A), 4.4.7 (Alternative B), 4.5.7 (Alternative C), and 4.6.7 (Alternative D). Proper implementation of these protective measures should ensure that impacts to EFH are minimal.

EFH Finding

Based on protective measures (stipulations and ROPs) and the low numbers of salmon utilizing the systems, oil and gas exploration and development in Northeast NPR-A is not expected to impact salmon or their habitat and is assigned the EFH determination: *May affect, not likely to adversely affect*.